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April 1997



**BEFORE THE  
FEDERAL COMMUNICATIONS COMMISSION  
WASHINGTON, DC 20554**

In the matter of	)	
	)	
Application of SBC Communications Inc.,	)	
Southwestern Bell Telephone Company,	)	CC Docket No. _____
and Southwestern Bell Communications	)	
Services, Inc., for Provision of In-Region,	)	
InterLATA Services in Oklahoma	)	

**AFFIDAVIT OF RICHARD L. SCHMALENSEE**

**I. QUALIFICATIONS**

RICHARD L. SCHMALENSEE, being duly sworn, deposes and says:

1. My name is Richard L. Schmalensee. I am the Gordon Y Billard Professor of Economics and Management at the Massachusetts Institute of Technology (MIT), Deputy Dean of MIT's Sloan School of Management, and a Special Consultant to National Economic Research Associates, Inc. (NERA). My business address is One Main Street, Cambridge, Massachusetts 02142.
  
2. I served as a Member of President Bush's Council of Economic Advisers, where I had primary responsibility for domestic and regulatory policy, including telecommunications policy. I have done extensive research on aspects of industrial organization and of antitrust and regulatory policy, and I teach graduate courses in industrial organization, its applications to management decisions, government regulation, and government/business relations. I am the author of *The Economics of Advertising* and *The Control of Natural Monopolies* and co-author of *Markets for Power*. I am the co-editor of the *Handbook of Industrial Organization* and founding editor of the MIT Press *Regulation of Economic Activity* monograph series. I have published over 60 articles and have served on editorial boards of several professional journals. I am a Fellow of the Econometric

Society and of the American Academy of Arts and Sciences, and I have served on the Executive Committee of the American Economic Association. I have testified before federal and state courts, Congressional committees, and the Federal Trade Commission. I have served as a consultant on regulatory and competitive issues to numerous organizations in the United States and abroad, including the U.S. Federal Trade Commission and the Antitrust Division of the U.S. Department of Justice. I received S.B. and Ph.D. degrees in economics from MIT. A copy of my resume is in the appendix.

## **II. INTRODUCTION**

3. Counsel for SBC Communications Inc. ("SBC"), Southwestern Bell Telephone Company ("SWBT"), Southwestern Bell Communications Services, Inc. d/b/a Southwestern Bell Long Distance ("SBLD")—collectively, "Southwestern Bell"—has asked me to assess SBLD's credibility as an entrant into the interexchange services market in its "home region." This affidavit reports on my assessment. I understand that it supplements expert affidavits which evaluate other aspects of SBLD's prospective entry.

4. Why is such an assessment useful? One would expect that SBLD's entry into the interexchange market would increase competition in that market. If so, the results would tend to be lower prices, new and better service offerings, increased customer satisfaction, and perhaps more rapid technological improvements. The ultimate beneficiaries of these improvements would be the public which buys interexchange services. For all these improvements to follow, SBLD should have reasonable prospects for success in the interexchange market; if, to the contrary, its entry were not credible, then its entry is unlikely to have a significant effect on that market. Thus the relevance of my investigation and this report on SBLD's prospects. The credibility of its success supports the public interest benefits of its being allowed to enter the interexchange market.

5. Let me be clear about what this report is and is not. I assess SBLD's strengths and weaknesses regarding its entry into the interexchange market. Does this mean I can predict with confidence that SBLD's entry will be profitable for SBC's stockholders? No. Market entry is almost always a risky proposition. I am certainly not issuing a buy or sell recommendation to SBC's stockholders. Rather, using publicly available information, I assess the plausibility—not probability—of SBLD's success.

6. Briefly, these are my findings:

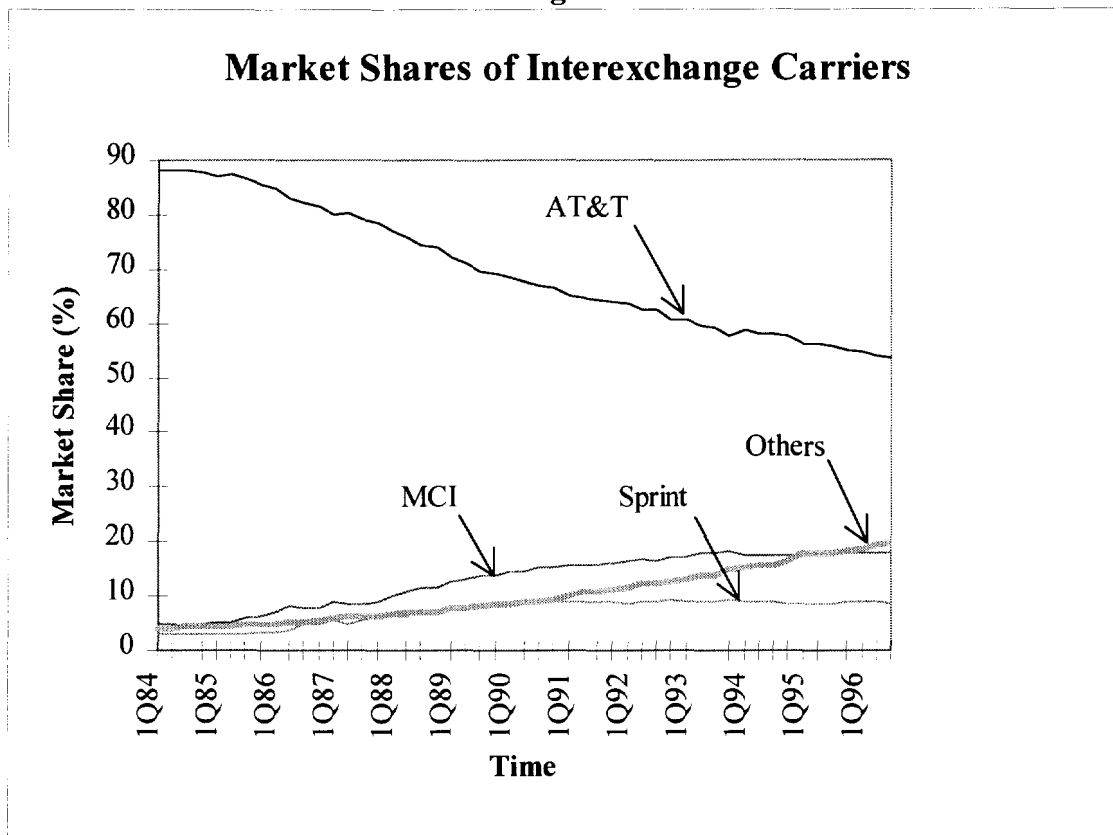
- A useful approach is to compare SBLD's strengths not only with the three largest interexchange carriers but also with those of a hypothetical *de novo* entrant into the interexchange market and with those of existing small interexchange carriers. I explain this approach in Section III.
- Particularly in the long run, SBLD would have low incremental costs of providing interexchange service, as I explain in Section IV.
- SWBT's reputation with the customers in its region is excellent, so SBLD's marketing position would be good. Its strength would be particularly important for the low-usage customers which other carriers tend to neglect, so it can increase competitiveness in the market for that segment in a way that other carriers have not. Section V covers this topic.
- The combination of low incremental costs and a good marketing position make the company a credible competitor in the interexchange market, as Section VI explains. Although SBLD has competitive strengths, however, these strengths do not appear great enough for the company to dominate the interexchange market.



### III. AN ANALYTICAL APPROACH

7. The Federal Communications Commission (FCC) periodically reports on interexchange carrier market shares. It measures market share using access minutes, presubscribed lines, and toll revenues. For present purposes, revenues are a useful summary measure. Figure 1 below shows the toll revenue market shares for AT&T, MCI, Sprint, and all other carriers combined.<sup>1</sup>

8. **Figure 1**



9. Since the first quarter of 1984, AT&T's market share has declined every year. In contrast, the market shares for MCI and Sprint generally grew; however, Sprint's share growth appears to have reached a plateau in 1991, and MCI's reached a plateau in 1993. What I find most interesting about the FCC data is the series for all other carriers combined. Their revenue share

<sup>1</sup> FCC, "Long Distance Market Shares Third Quarter 1996" (January, 1997). The FCC report shows LDDS Worldcom separately, whereas, to simplify the presentation, Figure 2 combines LDDS Worldcom with all other carriers. The lesson from the data would not be changed if LDDS Worldcom were shown separately.

increased every year, and it has not hit a plateau. This pattern of growth by the smallest carriers is consistent with tacit price coordination among the big three carriers, or at least with a tight-knit oligopoly: for the time being the big carriers appear willing to accept gradually eroding market share—in the case of AT&T—or stable market share—in the case of MCI and Sprint—in exchange for the higher profits they can earn currently relative to what they could earn if they were to compete more aggressively. For this report, though, my focus instead is on the lesson that the share growth by the smaller interexchange carriers suggests that there is a promising market opportunity for small or perhaps even newly-entering carriers. If, to the contrary, the market share of the small carriers were declining, I would be more concerned about SBLD's likely prospects in the interexchange market.

10. The FCC data are qualitatively consistent with another study by a market survey company called Odyssey. It reports the percentage of U.S. households using each long distance carrier:<sup>2</sup>

11.

**Table 1**  
**Market Shares of Interexchange Carriers**  
**(Percentage of U.S. Households)**

Carrier	4Q94	1Q95	4Q95	1Q96
AT&T	74	71	66	65
MCI	11	12	13	12
Sprint	4	4	4	5
Other	—	7	12	12
Don't know/no answer	11	6	5	6

12. According to these data, too, while AT&T's market share is declining, MCI's and Sprint's shares are stable, and the other carriers' share is growing. The study also reports that "consumers who rated AT&T's image as 'very good' fell from 68% two years ago to 59% in the latest survey."<sup>3</sup>

<sup>2</sup> Sandra Guy, "Reselling Upends IXCs' Marketing Plan," *Telephony* (July 1, 1996), p. 20.

<sup>3</sup> *Ibid.*

Emphasizing the growing market share of resellers, the article states, "The findings point to a potentially lucrative field for the Bell companies, which can succeed in their foray into long-distance by becoming 'super resellers,'"<sup>4</sup> according to a separate report by the Yankee Group.

13. Based on its assessment of the attractiveness of the RBOCs and turnover of customers of the interexchange carriers, the Yankee Group's report estimates that the RBOCs in the aggregate will achieve about a 10 to 15 percent share of the national interLATA household market 18 months after entering the market.<sup>5</sup> If SBLD's success were equal to that of the average RBOC and if it were to focus on customers in its home region, then its share of the household market within its region would also equal between 10 to 15 percent. Since it has about 12 percent of RBOC access lines, then, based on the Yankee Group predictions, its share of the national interLATA household market would be about 1.2 to 1.7 percent.<sup>6</sup>

14. I should point out that these data are suggestive, not definitive. Although insufficient by themselves, the combination of these data and the other information discussed in the sections below more convincingly portray the picture of SBLD's entry prospects.

15. The oligopoly profits and pricing discipline of the big three carriers would have to diminish in the face of the market entry of SBLD and other new entrants. From the point of view of customers, the lower prices resulting from such a breakdown in profit margins and pricing discipline would be good news. To customers, whether SBLD fully accomplishes the profitability objectives of its business plan is relatively unimportant.

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<sup>4</sup> *Ibid.*

<sup>5</sup> The Yankee Group, "IXCs versus RBOCs: The Battle of the Century" (December, 1995), p. 24. This report also estimates that the RBOCs will lose about the same percentage of their local market in the same period of time (p. 26).

<sup>6</sup> These calculations do not account for SBC's proposed merger with Pacific Telesis.

16. Already, there are signs of downward pressure on prices; as one article puts it, "Further evidence of a changing long-distance market is apparent in BellSouth's recent agreement to buy wholesale long-distance transport from AT&T at what the RHC called 'the low end' of the 1¢- to 2¢-per-minute range. The agreement signifies a potentially radical change in consumer and business services pricing and the possibility of a real price war, said Robert Rich, vice president of telecommunications research at The Yankee Group."<sup>7</sup> These pressures could only increase when SBLD and the other RBOCs enter the in-region interLATA market.

17. Now we come to my main point. We have seen that smaller carriers are gradually gaining market share. Still, so far their gains have been insufficient to break down the pricing discipline of the big three carriers.<sup>8</sup> I explain in the sections below that SBLD has several strengths. These strengths might be sufficient for a more effective challenge to the big three than the existing smaller carriers have been, particularly for low-usage customers who have faced a succession of price increases in recent years.

18. Let me expand on that point about low-usage customers. That market segment—predominantly residential customers—is the largest group of customers, yet it is neglected in the competition among interexchange carriers. For example, in 1995, about 64 percent of AT&T's residential long distance customers in Oklahoma faced full, undiscounted toll rates.<sup>9</sup> Also consider Table 2 below. It shows data for 1995 from the FCC's market share report and a calculation I have made from the data. The FCC report shows each major interexchange carrier's number of presubscribed lines and gross toll revenues as reported to shareholders. From the FCC report, I

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<sup>7</sup> *Ibid.* At the time of the contract, BellSouth could only use the wholesale transport for cellular and out-of-region resale activities.

<sup>8</sup> See, e.g., P. W. MacAvoy, *op. cit.*; also see W. E. Taylor and J. D. Zona, *op. cit.*

<sup>9</sup> Based on results of analysis of data from PNR and Associates, Inc., Jenkintown, PA, "Bill Harvesting II."

show results for the ten largest interexchange carriers for which the FCC reports data on both presubscribed lines and revenues, plus data for all other interexchange carriers combined.<sup>10</sup>

19.

**Table 2**  
**Revenue per Presubscribed Line**

Carrier	Presubscribed Lines in 1995	Revenue (M) in 1995	Revenue per Presubscribed Line in 1995
AT&T	\$101,136,792	\$38,069	\$376
MCI	\$23,911,437	\$12,924	\$540
Sprint	\$9,784,388	\$7,277	\$744
LDDS Worldcom	\$4,068,816	\$3,640	\$895
Frontier companies	\$2,348,301	\$1,396	\$594
Excel Telecommunications	\$1,486,953	\$363	\$244
LCI	\$1,442,098	\$671	\$465
Cable & Wireless	\$543,617	\$700	\$1,288
U.S. Long Distance	\$212,611	\$155	\$729
Business Telecom	\$146,118	\$115	\$787
All others	<u>\$4,151,308</u>	<u>\$7,140</u>	<u>\$1,720</u>
Total	\$149,232,439	\$72,450	\$485

20. What we see in the last column is that all the carriers except one have higher gross toll revenues per presubscribed line than AT&T does. The only exception is Excel Telecommunications, which, according to the FCC report, is a pure reseller and which is only about one percent of AT&T's size. The lesson is that the carriers other than AT&T tend more to focus on high-volume customers than AT&T does.

21. This pattern is not surprising, since interexchange carriers bear some fixed costs per customer. Such fixed costs include a fee paid to a local exchange carrier for processing a

<sup>10</sup> I have selected the ten largest carriers based on their number of presubscribed lines. Had I selected the largest carriers based on their revenues, that selection process would have introduced a bias toward displaying carriers which have high revenue per line relative to AT&T. Since I have selected the largest carriers based on their number of lines, I avoid that selection bias. One should use these data with caution. The data for revenues might not be fully comparable to the data for presubscribed lines and might not be defined in the same way by different carriers. One should use special caution regarding the revenue figure for "all others," since it is calculated as a residual from the figure for total revenues, which the FCC staff has estimated. In some cases, such as the Frontier companies, I have added together the data for several subsidiaries of a corporate parent.

presubscription order and some of the costs of marketing, customer care, and billing. To some extent the latter three types of costs increase with a customer's volume of usage, but there is a fixed component, too. Thus, since the low-usage segment is more costly to acquire and serve relative to the revenues it generates, and since this segment is less inclined to change carriers, it is not as profitable a segment to pursue aggressively. AT&T has even claimed in an affidavit that it loses money on these low-volume customers.<sup>11</sup> As I explain in Section V below, this market segment should be less costly for SBLD to serve than it is for other existing interexchange carriers, so SBLD's entry holds out the prospect of more intensified competition for this segment and more benefits to those consumers than for the other segments where competition is relatively stronger.

#### **IV. SBLD HAS THE POTENTIAL TO HAVE LOW INCREMENTAL COSTS**

22. There are functions for which economies of scope would potentially strengthen SBLD's prospects for success when it enters the interexchange market. These economies might enable it to challenge the big three interexchange carriers more effectively than small carriers and resellers have to date. Absent legal and regulatory restrictions, such potential economies exist for at least the following functions:

- Certain transmission facilities
- Sales and marketing
- Customer care
- Billing.

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<sup>11</sup> Order, In the Matter of Motion of AT&T Corp. To Be Reclassified as a Non-Dominant Carrier, 11 F.C.C. Rcd. 3271, 3315 (October 23, 1995); AT&T's Opposition to the Four RBOCs' Motion To Vacate the Decree at 95-96, United States v. Western Elec. Co., No. 82-0192 (D.C.C. Dec. 7, 1994).

Such economies of scope could conserve on the economy's scarce resources and benefit consumers. Ironically, Section 272 of the Telecommunications Act and the FCC order implementing the Act require SBLD to operate largely as a separate, arms-length subsidiary for at least three years; and the FCC could extend the requirement beyond that period. The principal permissible joint activities are sales, sales support systems, and customer support. The separate subsidiary restriction may tend to postpone the time when competitive forces will determine whether vertically integrated or non-vertically integrated carriers are the most effective and efficient means of serving customers.

## **V. SBLD'S MARKET POSITION**

23. There is evidence about the market credibility of local exchange carriers such as SWBT. C/J Research conducted a survey in January, 1996. The survey called Comm-Trac asked residential customers about their satisfaction with companies providing long-distance service, local telephone service, cellular service, and cable TV service. The most relevant data compare customers' opinions of the current long-distance companies with local exchange carriers. The survey found that local exchange carriers met or exceeded expectations for 85.4 percent of respondents, whereas long distance carriers did so for 91.1 percent. To put these figures in perspective, cable TV companies met or exceeded expectations for only 67.3 percent of respondents. Thus, although satisfaction with the long distance carriers is slightly higher than it is with local exchange carriers, satisfaction with both is high, and the difference in satisfaction between long distance carriers and local carriers is small relative to the difference in satisfaction between either of these types of carriers and the cable companies. The survey also asked respondents whether they would change their carrier when a new company begins offering service. The result is that 12.8 percent of residential customers say they would either definitely or probably switch long-distance carrier, while 15.6 percent say they would definitely or probably switch local

exchange carrier. This small difference between the two markets contrasts with the large difference between either of those two markets and the cable TV market: for the latter market 37.0 percent said that they would definitely or probably switch.

24. The Yankee Group conducted a similar study among consumers and found similar levels of satisfaction with the three kinds of carriers as the Comm-Trac survey did. It found that 89 percent of consumers rate the services of long distance carriers as good or excellent; 85 percent of them rated local exchange carrier services at that level; and just 61 percent rated the services of cable TV companies at that level.<sup>12</sup> The data indicate high satisfaction with local exchange carriers in general as service providers. The Yankee Group updated its study in 1996, and the update shows results for individual RBOCs. To help add to the information from the previous Yankee Group study, Table 3 reports results for more detailed questions; I show the percentage of customers who rate a carrier as excellent; and I compare ratings of SWBT with interexchange carriers and cable companies:<sup>13</sup>

25. **Table 3**  
**Percentage of Households Rating Carrier as Excellent**

Subject	SWBT	Interexchange Carriers	Cable TV
Professional and Courteous Personnel	23.9	25.2	11.5
Accurate and Easy-to-Understand Bills	25.0	25.5	15.6
Timely Resolution of Problems	22.3	22.1	11.2
Quick Access to Customer Service	17.6	21.0	10.5
Value for the Money	14.9	18.3	6.3
High-Quality Transmission	24.5	26.2	8.3
Trustworthiness	23.4	24.4	8.7
Deserving of Loyalty	20.2	23.4	7.5

<sup>12</sup> The Yankee Group, "IXCs versus RBOCs: The Battle of the Century" (December, 1995), p. 33. The report also finds ratings of 76 percent for electric companies and 70 percent for cellular carriers.

<sup>13</sup> The Yankee Group, "The 1996 TAF Survey: Implications for Convergence" (1996), p.14; also detailed data obtained directly from The Yankee Group.



For most measures, SWBT's ratings are close to those of the interexchange carriers, and, again, the cable TV companies lag far behind.

26. A survey by IDC/LINK yields similar information. In its 1995 Home Media Consumer Survey, the research firm asked U.S. households to rate their long distance company, local telephone company, and cable TV company.<sup>14</sup> Table 4 shows the results for SWBT specifically, the RBOCs in total, and interexchange carriers in total:

27.

**Table 4**  
**Percentage of Households Rating Carrier as Very Good or Good**

Subject	SWBT	Local Exchange Carriers	Interexchange Carriers
Customer Service	75	75	80
Service Reliability and Product Quality	74	76	81

28. Again, the differences between local exchange carriers or SWBT and long distance carriers is small. If the difference were large, then one would have substantial concerns about SBLD's entry prospects. But such small differences in percentages generally imply that there is a large customer segment which rates SWBT as well as or better than the interexchange carriers; further, such a small difference in percentages can be overcome by reasonably diligent efforts.

29. The FCC also collects data which enable comparisons among individual local exchange carriers.<sup>15</sup> According to the FCC data obtained from the carriers, customer satisfaction with SWBT has been close to that for the Bell companies as a whole in recent years. For residential customers,

<sup>14</sup> IDC/LINK reports selected results in Rona Shuchat, "Brand Awareness: The Critical Key to Success," IDC/LINK #11179, Volume 1, Tab 1 Market Analysis (March 1996), p. 8. IDC/LINK provided the detailed data directly.

<sup>15</sup> Jonathan M. Kraushaar, "Update on Quality of Service for the Local Operating Companies Aggregated to the Holding Company Level," Common Carrier Bureau—Industry Analysis Division, Federal Communications Commission (March, 1996). The report cautions that some of the data might not be fully consistent among companies or over time for a given company. The FCC aggregates operating-company data to the holding company level using an unweighted average of operating-company data. The FCC report does not cover non-Bell companies.

from 1H91 through 1H95 (the most recent period with data in the FCC report) the percentage of customers satisfied has exceeded that of the Bell average for seven out of nine semiannual periods and has equaled the average in one period. During that four and a half years as a whole, an average of 94.7 percent of SWBT residential customers were satisfied, as compared with 93.5 percent for the Bell companies in total. The percentage of SWBT small business customers who were satisfied averaged 94.1 compared with 93.0 for the Bell companies as a whole.<sup>16</sup>

30. Since divestiture, the RBOCs have developed marketing and competitive skills that were inadequate prior to divestiture. Moreover, they have cut costs. For example, SWBT reduced its employees per access line by 16 percent from 1991 to 1995.<sup>17</sup> That is equivalent to a 4.25 percent per year reduction, compounded, in spite of an increase in usage per line and the introduction of new services. The RBOCs have honed their competitive skills in a variety of markets that have become competitive or that were competitive early on. Such markets include customer premises equipment, cellular service, certain vertical services, Centrex service, inside wiring installation and maintenance, Yellow Pages, billing and collection services offered to interexchange carriers, and, more recently, intraLATA toll service.

31. Staffing heavily from SWBT (and other telecommunications firms), SBLD will obviously be thoroughly experienced in the telecommunications industry, its market needs, its operational requirements, its technologies, and its equipment suppliers. In particular, its employees will have experience in the toll market because SWBT had already been providing intraLATA toll services.

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<sup>16</sup> The FCC report also shows data for large business customers; however, the data are not available for all companies for all years. The FCC reports an RBOC average only through the first half of 1993. Satisfaction of Southwestern Bell's large business customers exceeded the RBOC average for all five semiannual periods since 1991.

<sup>17</sup> SBC annual reports. The data on the number of employees are for SBC as a whole, before the SBC-Pacific Telesis merger.

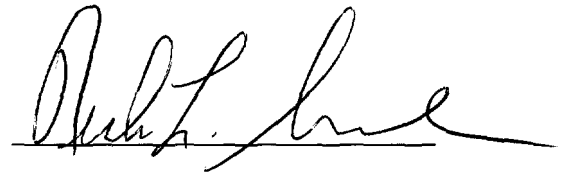
32. When entering the interLATA market, SBLD might position itself as a discount carrier. It might instead differentiate itself by providing superior customer service, quality, or distinctive services. Either way, this additional competition would force the incumbents to respond in kind or by making their offerings more attractive in innovative new ways. Whatever the competitive response, customers—both business and residential—would benefit.

## **VI. CONCLUSIONS**

33. As we have seen, Southwestern Bell has a good market position to expand its service offerings to include interexchange services. After expiration of the separate-subsidary restrictions established by the Act and implemented by the FCC order in Docket 96-149, it will be helped by additional economies of scope between it and SWBT. It remains to be seen whether market and financial success in the interexchange market will be determined by which carrier can offer the most economical and effective service to customers, or whether instead the outcome will be dominated by regulatory restrictions on the local exchange carriers, where regulators tilt the playing field this way and that to handicap the players. Certainly, the separate subsidiary requirement implies that there is a risk that the regulations will determine the outcome. Advocates for such a policy argue that this restriction helps to prevent anticompetitive abuses by the RBOCs. At the same time, however, this requirement slows the realization of the economies of scope which the RBOCs' entry into the interexchange market should make possible.

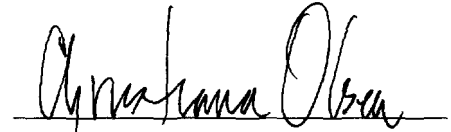
34. At least one economy of scope will be realizable immediately, even under the separate-subsidary requirement—the benefit of the existing Southwestern Bell brand name. As explained in Section V, through its high-quality service and advertising, SWBT has achieved considerable customer recognition, loyalty, and trust. Many customers might have hesitated to buy their interexchange service from a “no-name” carrier. (I do not intend to disparage the small interexchange carriers but rather to indicate how a customer, unfamiliar with the quality and value of such

a carrier's services, might tend to perceive them.) In contrast, most of SWBT's customers are familiar with the Southwestern Bell brand name and have a favorable opinion about the company's quality of service and value. Thus, on this basis at least, SBLD might be able to offer an effective competitive challenge to existing interexchange carriers even if it were to enter the interLATA market as a pure reseller. In addition, the SBC family is large (although not nearly as large as AT&T or MCI); it has substantial positive cash flows; it has healthy relations with the stock, bond, and banking markets; and its securities are rated as low risk. Thus, it is in a good position to fund necessary construction and entry start-up costs. For all the above reasons, SBLD is a credible competitor in the interLATA market and so has good prospects for intensifying competition in that market. Such an intensification of competition would benefit consumers and would be in the public interest.



Richard L. Schmalensee

Subscribed and sworn to before me this 7<sup>th</sup> day of April 1997.



Notary Public

My commission expires: September 10, 2003.

## **CURRICULUM VITAE**

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MASSACHUSETTS INSTITUTE OF TECHNOLOGY  
S.B., Economics, Politics and Science, 1965  
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### **EMPLOYMENT:**

MASSACHUSETTS INSTITUTE OF TECHNOLOGY  
1996- Deputy Dean, Sloan School of Management  
1991- Director, Center for Energy and Environmental Policy Research  
1988- Gordon Y Billard Professor of Economics and Management  
1986- Professor, Department of Economics  
1979- Professor, Sloan School of Management  
1977-79 Associate Professor, Sloan School of Management  
1970 Assistant Professor, Sloan School of Management (Spring)  
1967-69 Instructor, Sloan School of Management

PRESIDENT'S COUNCIL OF ECONOMIC ADVISORS  
1989-91 Member  
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1985-86 Visiting Professor, Harvard Business School  
1985 Visiting Professor, CORE, University of Louvain, Belgium (Spring)  
1980-81 Visiting Scholar, Department of Economics, Harvard University  
1973-74 Visiting Associate Professor and Research Fellow, Department of Economics,  
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**EDITORIAL SERVICE:**

Editorial Board: *Journal of Economics and Management Strategy*, 1992-  
Associate Editor: *Journal of Economic Perspectives*, 1992-  
Associate Editor: *Zeitschrift für Nationalökonomie*, 1987-89, 1993-  
Associate Editor: *International Journal of Industrial Organization*, 1982-89  
Board of Editors: *American Economic Review*, 1982-86  
Associate Editor: *Recherches Economiques de Louvain*, 1979-89  
Founding Editor, 1978-89; Co-Editor, 1989-: MIT Press Series, *Regulation of Economic Activity*  
Associate Editor, 1977-81; Board of Editors, 1981-89: *Journal of Industrial Economics*

**PROFESSIONAL ASSOCIATIONS:**

American Economic Association: Executive Committee, 1993-95; Budget Committee, 1993-95;  
Nominating Committee, 1987; Advisory Committee on Meetings Program, 1986, 1989, 1994  
Econometric Society: Chairman, Local Arrangements Committee, 1985 World Congress; Chairman,  
Program Committee, 1980 North American Fall Meeting; Program Committee, 1980 World  
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**SLOAN SCHOOL ADMINISTRATION:**

Deputy Dean, 1996-  
Area Head: Economics, Finance, and Accounting, 1987-89  
Coordinator: Applied Economics Group, 1986-87  
Chairman: Doctoral Program Committee, 1982-85

**CONSULTATION AND GOVERNMENT SERVICE (SELECTED):**

National Research Council, Transportation Research Board, Committee for the Study of Transportation  
and a Sustainable Environment, 1994-  
Environmental Economics Advisory Board, U.S. EPA, 1992-96  
Chairman: Clean Air Act Compliance Analysis Council, U.S. EPA, 1992-96  
Special Consultant: National Economic Research Associates, Inc., 1981-89, 1991-  
Antitrust Division, U.S. Department of Justice, 1991-92 (1992 Merger Guidelines)  
Bureau of Economics, U.S. Federal Trade Commission, 1972-81 (Antitrust Policy)

**AWARDS AND OTHER PROFESSIONAL ACTIVITIES:**

Fellow: American Academy of Arts and Sciences, 1995-  
(with P.L. Joskow and N. Tsukanova) 1995 Edward A. Hewett Prize, American Association for the  
Advancement of Slavic Studies  
Board of Academic Advisors: Pioneer Institute for Public Policy Research, 1995-  
*Revista de Análisis Económico* Lecture, Econometric Society Latin American Meeting, 1994  
Research Associate: National Bureau of Economic Research, 1992-  
Board of Directors: Long Island Lighting Company, 1992-  
Donald Gilbert Memorial Lecture, University of Rochester, 1992  
Board of Directors: American Council for Capital Formation Center for Policy Research, 1991-  
Fellow: Econometric Society, 1982-

**BOOKS WRITTEN:**

*The Economics of Advertising* (Vol. 80, Contributions to Economic Analysis), Amsterdam: North-Holland, 1972.

*Applied Microeconomics: Problems in Estimation, Forecasting and Decision-Making*, San Francisco: Holden-Day, 1973.

*An Introduction to Applied Macroeconomics* (with E. Kuh), Amsterdam: North-Holland, 1973.  
Japanese Edition, Tokyo: McGraw-Hill Kogakusha, 1975.

*The Control of Natural Monopolies*, Lexington: D.C. Heath (Lexington Books), 1979.

*Markets for Power: An Analysis of Electric Utility Deregulation* (with P. L. Joskow), Cambridge: MIT Press, 1983.

*Economics*, 2nd Edition (with S. Fischer and R. Dornbusch), New York: McGraw-Hill, 1988.

**BOOKS EDITED:**

*The Empirical Renaissance in Industrial Economics* (co-editor, with T. F. Bresnahan), Oxford: Basil Blackwell, 1987.

*Handbook of Industrial Organization* (co-editor, with R. D. Willig), Amsterdam: North-Holland, 1989.

**JOURNAL ARTICLES:**

"Regulation and the Durability of Goods." *Bell Journal of Economics and Management Science*, Vol. 1 (Spring 1970), pp. 54-64.

"Consumer's Surplus and Producer's Goods." *American Economic Review*, Vol. 61 (September 1971), pp. 682-687.

"A Note on Monopolistic Competition and Excess Capacity." *Journal of Political Economy*, Vol. 80 (May/June 1972), pp. 586-591.

"Option Demand and Consumer's Surplus: Valuing Price Changes Under Uncertainty." *American Economic Review*, Vol. 62 (December 1972), pp. 813-824.

"A Note on the Theory of Vertical Integration." *Journal of Political Economy*, Vol. 81 (March/April 1973), pp. 442-449.

"Brand Loyalty and Barriers to Entry." *Southern Economic Journal*, Vol. 40 (April 1974), pp. 579-588.

"Market Structure, Durability, and Maintenance Effort." *Review of Economic Studies*, Vol. 41 (April 1974), pp. 277-287.



- "Estimating the Costs and Benefits of Utility Regulation." *Quarterly Review of Economics and Business*, Vol. 14 (Summer 1974), pp. 51-64.
- "Consumer Behavior versus Economic Theory." *Recherches Economiques de Louvain*, Vol. 40 (September 1974), pp. 261-276.
- "Alternative Models of Bandit Selection." *Journal of Economic Theory*, Vol. 10 (June 1975), pp. 333-342.
- "An Experimental Study of Expectation Formation." *Econometrica*, Vol. 44 (January 1976), pp. 17-41.
- "Another Look at the Social Valuation of Input Price Changes." *American Economic Review*, Vol. 66 (March 1976), pp. 239-243.
- "Resource Exploitation Theory and the Behavior of the Oil Cartel." *European Economic Review*, Vol. 7 (April 1976), pp. 257-279.
- "Advertising and Profitability: Further Implications of the Null Hypothesis." *Journal of Industrial Economics*, Vol. 25 (September 1976), pp. 45-54.
- "A Model of Promotional Competition in Oligopoly." *Review of Economic Studies*, Vol. 43 (October 1976), pp. 493-507.
- "Is More Competition Necessarily Good?" *Industrial Organization Review*, Vol. 4 (1976), pp. 120-121.
- "Public Investment Criteria, Insurance Markets, and Income Taxes." *Journal of Public Economics*, Vol. 6 (November 1976), pp. 425-445.
- "Valuing Changes in Regulated Firms' Input Prices." *Southern Economic Journal*, Vol. 43 (January 1977), pp. 1346-1351.
- "Using the H Index of Concentration with Published Data." *Review of Economics and Statistics*, Vol. 59 (May 1977), pp. 186-193.
- "Comparative Static Properties of Regulated Airline Oligopolies." *Bell Journal of Economics*, Vol. 8 (Autumn 1977), pp. 565-576.
- "Nonconvexity and Optimal Exhaustion of Renewable Resources" (with T. R. Lewis). *International Economic Review*, Vol. 18 (October 1977), pp. 535-552.
- "Common Stock Volatility Expectations Implied by Option Premia" (with R. R. Trippi). *Journal of Finance*, Vol. 33 (March 1978), pp. 129-147.
- "A Note on Economies of Scale and Natural Monopoly in the Distribution of Public Utility Services." *Bell Journal of Economics*, Vol. 9 (Spring 1978), pp. 270-276.
- "A Model of Advertising and Product Quality." *Journal of Political Economy*, Vol. 87 (June 1978), pp. 485-504.